

Definitions



Abrasive wheel

A grinding tool consisting of bonded abrasive grains. This includes diamond and reinforced wheels.

Adjustable barrier guard

A barrier guard with provisions for adjustment to accommodate various jobs or tooling set-ups.

Air-lift hammer

A type of gravity drop hammer in which the ram is raised for each stroke by an air cylinder. Because the length of stroke can be controlled, ram velocity, and therefore the energy delivered to the workpiece, can be varied.

Anti-repeat

A device that limits the machine to a single stroke if the activating means is held in the operative position.

Arbor

A rotating shaft used for mounting and transmitting torque to a cutting tool.

Authorized person

Someone the employer has given the authority and responsibility to perform a specific assignment.

Awareness barrier

A barrier device that allows more access to the hazard area, but still restricts access enough to warn of an approaching hazard.

Barricade

A barrier such as a guardrail, fence, or other framework designed to prevent employee access and exposure to a hazard.



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Barrier guard

A barrier that provides a physical restriction from a hazard.

Belt conveyors

An endless belt of any material, operating over suitable pulleys to move materials placed on the belt.

Belt pole

A device used in shifting belts on and off fixed pulleys on line or countershaft where there are no loose pulleys. Belt poles are sometimes called "belt shippers" or "shipper poles."

Belt shifter

A device for mechanically shifting belts from tight to loose idler pulleys or vice versa, or for shifting belts on cones of speed pulleys.

Bench grinder

A bench mounted off-hand grinding machine with either one or 2 wheels mounted on a horizontal spindle.

Bending

The application of stress concentrated at specific points to permanently turn, press or force from a straight, level or flat condition to a curved or angular configuration.

Blade

A replaceable tool having one or more cutting edges for shearing, notching or coping.

Blanking

To bypass a portion of the sensing field of a presence-sensing device. The purpose is to allow objects such as tooling, feed stock, and workpieces to pass through the sensing field without sending a stop signal to the controlled machine. There are 2 blanking modes: fixed and floating.

Definitions



Blind hole

A hole drilled in an object, such as an abrasive wheel, that doesn't go all the way through the object.

Blotter

A compressible disc or washer, usually of blotting paper, plastic, cardboard, or gasket material, that's used between the wheel and the flanges to evenly distribute flange pressure on the wheel.

Board hammer

A type of gravity drop hammer where wood boards attached to the ram are raised vertically by action of contra rotating rolls, and then released. Energy for forging is obtained by the mass and velocity of the freely falling ram and the attached upper die.

Bolster plate

Plate attached to the press bed having holes, T-slots, or other means for attaching the lower die or die shoe.

Brake

Mechanism for stopping or preventing motion.

Chain conveyor

A conveyor in which one or more chains (including those with paddles or bars attached to them) move the conveyor. Specific examples of chain conveyors include drag, rolling, pusher bar, pusher chain and sliding chain conveyors.

Channel blanking

A feature that allows a safety light curtain system to be programmed to ignore objects. Also called "fixed blanking."

Chipper

A machine that cuts material into chips.



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Chuck

A revolving clamp-like device used for holding and driving the workpiece.

Clutch

A mechanism to couple the flywheel to the crankshaft. When engaged, it allows the driving force to be transmitted to the press slide.

Comb (See feather board)

Concurrent

Occurring at the same time.

Cone Pulley

A pulley having 2 or more steps in a conical shape for driving machinery.

Cone and plug wheels (Types 16, 17, 18, 18R, and 19)

Abrasive wheels manufactured with blind hole threaded bushings. They may be used on all surfaces except the flat mounting surface. Specific characteristics of the different cone and plug wheels are:

- Type 16 cones have a curved side with a nose radius.
- Type 17 cones have straight sides with or without a nose radius.
- Type 18 and 18R plug wheels are cylindrical in shape with either a square or curved grinding end.
- Type 19 cone wheels are a combination of cone and plug shapes.

Control system

Sensors, manual input and mode selection elements, interlocking and decision-making circuitry, and output elements of the press-operating devices and mechanisms.

Definitions



Coping-notching

Where the edge or periphery of the workpiece is sheared.

Counterbalance

Mechanism used to balance or support the weight of the connecting rods, slide, and slide attachments.

Cutting-off wheels

Abrasive wheels used to cut material such as masonry, pipe, etc.

Cutting tool or saw blade

A tool used on a metal sawing machine.

Cycle

The complete movement of the ram from its starting position and return to that same starting position.

Dado

A straight-sided groove, perpendicular to the face of the workpiece, having a width greater than the thickness of a single saw blade.

Device

A control or attachment that's any of the following:

- Restrains the operator from inadvertently reaching into the hazardous area.
- Prevents normal or hazardous operation if any part of an individual's body is inadvertently within the hazardous area.
- Automatically withdraws the operator's hands, if the operator's hands are inadvertently within the hazardous area during the hazardous portion of the machine cycle.
- Maintains the operator or the operator's hands during the hazardous portion of the machine cycle at a safe distance from the hazardous area.



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Die or dies

Tooling used in a press for shearing, punching, forming, drawing, or assembling metal or other material.

Die enclosure guard

Guard attached to the die shoe or stripper in a fixed position.

Die setter

A person who installs or removes dies from the press, and makes the necessary adjustments so the tooling functions properly and safely.

Die setting

Process of installing or removing dies, and adjusting the dies, other tooling and the safeguarding guards or devices.

Die shoe

Plate or block that a die holder is mounted on. It functions primarily as a base for the complete die assembly and, if used, is bolted or clamped to the bolster plate or the face of the slide.

Die shutheight

Actual or design dimension between the mounting surfaces of a die.

Divider

A machine that mechanically divides the dough into pieces of predetermined volume or weight.

Dough Sheeter (See sheeter)

Dressed

When material is removed from the cutting surfaces of an abrasive wheel to expose new sharp cutting surfaces.

Definitions



Drilling/boring machine

A single or multiple spindle machine that uses a rotating cylindrical tool such as a drill, a counterboring tool, and similar tools to produce a hole, blind hole, counterbore, countersink, and similar cavities in workpieces. A work support means is provided to feed the tool into the workpiece or the workpiece into the tool.

Dross

Waste product or impurities formed on the surface of molten metal.

Dump bin and blender

That part of the flour handling system where the containers of flour are emptied.

Face of the slide

Surface of the slide to which the punch or upper die is generally attached.

Feather board/comb

A work-guiding and hold-down device consisting of stock with a series of spring-like fingers along the edge, set and positioned at an angle to the workpiece.

Feeding

Placing material in or removing it from the point of operation.

Fence

A device used to locate and guide a workpiece relative to the cutting tool.

Fixed barricade

A guard attached to a fixed surface used to enclose a hazardous area and prevent employees from placing any part of their body into the point of operation.

Fixed barrier guard

A guard attached to the frame, bolster, or other surface to enclose all or part of the point of operation or other hazard area.



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Fixed blade

A stationary blade having one or more cutting edges.

Fixed blanking

A feature that allows a safety light curtain system to be programmed to ignore objects. Also called "channel blanking."

Fixture/jig

A device used to locate, hold, or clamp one or more workpieces in a desired position.

Flanges

Collars, discs, or plates between or against which wheels are mounted. There are 4 types of flanges:

- Adaptor
- Sleeve
- Straight relieved
- Straight unrelieved

Floating blanking (floating window)

A feature that allows a safety light curtain system to be programmed to ignore the interruption of one or 2 beams within the light curtain. This allows the feeding of an object through the defined area at any point along the length of the curtain without causing it to produce a stop signal.

Floorstand grinder

A floor mounted, off-hand grinding machine with one or 2 wheels mounted on a horizontal spindle. The wheels are normally 24 inches or 30 inches in diameter and used for snagging operations.

Definitions



Forging

Metal formed to a desired shape by impact or pressure in hammers, forging machines (upsetters), presses, rolls, and related forming equipment. Forging hammers, counterblow equipment, and high-energy-rate forging machines impart impact to the workpiece, while most other types of forging equipment impart squeeze pressure in shaping the stock. Some metals can be forged at room temperature, but the majority of metals are made more plastic for forging with heat. Forged or drop forged parts are much stronger than poured or cast parts from foundries.

Forging presses

A class of forging equipment where the shaping of metal between dies is performed by mechanical or hydraulic pressure and usually is accomplished with a single workstroke of the press for each die station.

Full revolution clutch

Type of clutch that, when engaged, can't be disengaged until the press has completed a single cycle (stroke).

Gage (See miter gage)

Gap (throat)

An opening or recess in the frame of the machine to permit positioning of material or workpieces.

Gate or movable barrier device

Safeguarding device that encloses the point of operation before press motion can be initiated.

Guard (abrasive wheels)

An enclosure designed to restrain the pieces of an abrasive wheel and furnish protection to the operator if the wheel is broken during operation.



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Guard

A barrier that does at least one of the following:

- Prevents the hands or other body part from reaching through, over, under, or around the guard into the hazard area.
- Prevents objects or debris from falling onto or being ejected towards an employee.

Guidepost

The pin attached to the upper or lower die shoe. It operates within the bushing on the opposing die shoe to maintain the alignment of the upper and lower dies.

Hazard

A condition that could cause physical harm to a person.

Hazard area

An area or space that poses an immediate or impending physical hazard.

Hog

A machine used for cutting or grinding slabs and other coarse residue from the mill.

Horizontal lathe

A turning machine in which the workpiece revolves about a horizontal axis. While the work is revolving, it's being shaped by cutting tools working either parallel to the axis of the work or at an angle to the axis of the work.

Idler (pulley)

A pulley or roller on a shaft that presses against or rests on a drive belt to guide it or take up slack.

Inch

Die setting mode that engages the driving clutch so a small portion of one cycle (stroke) occurs, depending upon the length of time the operator control is held actuated.

Definitions



Indirect recirculating ovens

Ovens that are equipped with a gas-tight duct system, a furnace, and a circulating fan. Combustion gases are circulated through this enclosed system and mixed with fresh combustion gases generated by the burner in the combustion chamber. A vent or overflow removes a portion of the gases to make room for the fresh gases added by the burner. No unburned gases or products of combustion enter the baking chamber.

Interlocked barrier guard

Barrier attached to the press frame and interlocked with the press control system so the press stroke can't be started normally unless the guard, or its hinged or movable sections, enclose the point of operation.

Inverted swing and jump saws

Saws with a saw blade starting position below the table, where the blade must travel through the horizontal plane of the tabletop to make the cut on the stock.

Ironworker

A machine with multiple workstations at which various operations may be performed singly or simultaneously, including but not limited to:

- Punching
- Shearing
- Notching
- Coping,
- and**
- Forming.

Jig (See fixture)

Jog

Die setting mode where intermittent motion's imparted to the slide by momentary operation of the drive motor after the flywheel is at rest and the clutch is engaged.



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Jointer

A machine that has a cylindrical cutter head with more than one knife or cutting edge. It has an adjustable in-feed means of work support, or an adjustable cutter head or knives, as well as a fence or other workpiece guide.

Jump saw

A machine that utilizes a means of work support and hold down, and has a powered arbor on an arm that pivots about a point located behind the saw arbor at approximately the same height. At rest position the saw blade is below the workpiece. See Inverted swing and jump saws.

Kerf

The slot made by a saw blade as it saws through a workpiece.

Kickback

The uncontrolled propulsion or self-feed type action of a workpiece in the direction of the rotation or travel of the working portion of the saw, cutting tool, sanding belt, or sanding head.

Live roller conveyor

A series of rollers with objects moving over them through power to all or some of the rollers. The power is usually transmitted by a belt or chain.

Mandrel

Tooling or a machine component used to provide internal support. It can be a spindle or shaft on which a tool is mounted, such as a drill bit.

Manlift

A device consisting of a power-driven endless belt moving in one direction only, and provided with steps or platforms and handholds attached to it for the transportation of personnel from floor to floor.

Definitions



Manual feeding

The operator puts material or the part being processed into the press for each cycle (stroke).

Maximum exposure angle

The largest part of a wheel that doesn't need to be covered by a safety guard.

Miter gage

A device used as a workpiece pusher, guided by a table groove.

Miter saw

A cutoff saw with a means of work support. It utilizes a powered arbor on an arm that pivots about a point located behind the saw arbor at approximately the same height. The saw arbor may also slide vertically. In the at-rest position, the saw blade is above the maximum capacity workpiece.

Mode

The state or condition of the control system that allows specific operations of the machine.

Modified types 6 and 11 wheels (terrazzo)

Similar to Type 6 "straight cup" wheels and Type 11 "flaring cup" wheels except for the bottom of the cup. The bottom of the cup is flat in Type 6 and 11 wheels. The modified wheels have bottoms that are sloped downwards towards the mounting hole. These modified wheels need to be mounted using a special tapered flange furnished by the tool manufacturer. These wheels are used in the terrazzo trade.

Molding machine

A machine that uses more than one arbor-mounted cylindrical, rotating cutting tool. It also uses power feeding, where once a workpiece is engaged, it carries the workpiece linearly through the balance of the intended operations, without further operator action. Operations can be performed on all surfaces of a workpiece. Workpieces can be hopper- or hand-loaded and are fed ribbon-style into the machine.



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Mortiser

A machine designed to produce a square or rectangular cavity through use of a moving, forming, or reciprocating tool. Means are provided to clamp and support the stock, and either move the stock into the tool or the tool into the stock.

Moulder

A machine in which the dough pieces are shaped and formed prior to final proofing.

Mounted wheels

Bonded abrasive wheels of various shapes, usually 2 inches diameter or smaller, that are secured to plain or threaded steel shafts or mandrels.

Movable barrier device (See gate or movable barrier device)

Nip-point belt and pulley guard

A guard that encloses the pulley and has rounded or rolled edge slots for the belt to pass through.

Off-hand grinding

Grinding of a workpiece that's held in the operator's hand.

Overland conveyor

A single or series of belt conveyors designed to carry bulk material long distances, usually following the general contour of the land.

Part revolution clutch

Type of clutch that can be disengaged before the press slide completes a full stroke.

Pedestal grinder

An off-hand grinding machine similar to a bench grinder mounted on or otherwise attached to a floor-mounted pedestal.

Definitions



Pinch point

Any point, other than the point of operation, where it's possible for a part of the body to be caught between moving parts or between a moving part and stationary one.

Planer

A machine with at least one cylindrical cutter head, that includes one or more inserted knife or cutting edge. A planer has a cutter head mounted over a means of work support. It also uses either an adjustable work support or cutter head to size the stock. The workpiece is usually power-fed.

Point of operation

The area on a machine where work is actually performed upon the material being processed.

Power-driven hammers

Types of drop hammers in which the ram is raised for each stroke by a double-action steam, air, or hydraulic cylinder, and the energy delivered to the workpiece is supplied by the velocity and weight of the ram and attached upper die driven downward by steam, air, or hydraulic pressure. Energy delivered during each stroke may be varied.

Power transmission parts

The mechanical components of a piece of equipment that, together with a source of power (sometimes referred to as a prime mover), provide the motion to a part of a machine or piece of equipment.

Presence-sensing device

A device that creates a sensing field, area, or plane to detect the presence of an individual or object.

Presence-sensing device initiation (PSDI)

Operating mode of a mechanical power press where a single cycle (stroke) is initiated by a presence-sensing device when it senses that the operator has finished feeding or removing parts and all parts of the operator's body are withdrawn from the sensing field of the device.



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Pull-back device

A device attached to the operator's hands and connected to the upper die or slide of the press that will pull the operator's hands out of the point of operation as the dies close.

Push block

A nonmetallic device with one or more handles. A push block also has a flat bottom surface with either a heel or friction material on it, used as a hold-down and feed device. The purpose of this is to provide a safe distance between the hands and the cutting tool.

Pusher-bar conveyor

Two endless chains cross-connected at intervals by bars or pushers that propel the load along the bed or trough.

Push stick

A nonmetallic stick shaped device designed to provide a safe distance between the hands and the cutting tool. It has, as part of its design, a notched end with a heel and toe to hold down and feed the workpiece past the cutting tool.

Racks

Carriers of pans, panned dough and bakery products. They are usually constructed of metal and mounted on casters or provided with trolleys for use on a monorail system.

Reinforced wheels

Organic bonded abrasive wheels which have webbing, fabric or filament to provide resistance to complete breaking of the wheel should it become cracked or damaged.

Repeat

An unintended or unexpected successive stroke of the press resulting from a malfunction.

Restraint device

A device with attachments for the operator's hands and wrists that prevent the operator from reaching into the hazardous area.

Definitions



Return-belt idlers

A roller that supports the return run of the conveyor belt.

Ripping

A sawing operation made through the thickness of the workpiece with the grain of natural wood, along the long dimension of a rectangular workpiece, and usually parallel to that edge on reconstituted wood products. Two or more pieces result from the operation.

Rivet-making machines

The same as upsetters and bolt-headers when producing rivets with stock diameter of one inch or more.

Riving knife (See spreader)

SFPM (See surface feet per minute)

Safeguarding by location

Because of its location, no employee can inadvertently come in contact with a hazard during operation, maintenance, or servicing.

Safeguarding by distance

Employees are kept far enough from a hazard that they won't contact or be injured by the hazard.

Safeguarding device (See device)

Safety block

A prop inserted between the upper and lower dies or between the bolster plate and the face of the slide to prevent the slide from falling of its own weight.

Safety cylinder

This safety device may be of the direct cushion type integral with the main cylinder or it may be of the separate cushion type whereby a constant supply of live steam or air is applied behind a separate piston adjacent to the main cylinder. A spring, suitably constrained, may also be employed.



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Safety cylinder head

An air cushion at the top of the hammer, just below the head, to protect the head from damage by the piston.

Scale

Any layer or leaf of metal resembling the scale of a fish in size and thinness; such as a scale of iron.

Screw conveyor

A screw or auger that revolves in a suitably shaped trough or casing, used to move material in one specific direction.

Shaper

A machine that uses one or more vertical spindles that are either fixed or able to be tilted, usually with an arbor mounted rotating cylindrical cutter, to form decorative or functional forms on a manually or power-fed workpiece. The workpiece is supported on a stationary or moving table. A guide, fixture, or template is used to control the operation. The spindle can be mounted above or below the work support means.

Sheeter

A machine that forms dough into a sheet by compression through one or more sets of driven rolls.

Sifter

A device that sifts flour. Sifter types are brush, oscillating, or vibrating.

Single stroke mechanism

Used on a full revolution clutch to limit the travel of the slide to one complete stroke at each engagement of the clutch.

Slat and roller slat conveyor

A conveyor employing one or more endless chains to which nonoverlapping, noninterlocking, spaced slats are attached.

Definitions



Slide

Part of the press that moves back and forth in a straight line. Also called a ram, plunger, or platen.

Snagging

Grinding which removes relatively large amounts of material without regard to close tolerances or surface finish.

Spreader

A flat metal device slightly narrower than the saw kerf. It's designed to prevent the saw blade kerf in the workpiece from closing on the sides of the blade during a sawing operation.

Steam hammers

A type of drop hammer where the ram is raised for each stroke by a double-action steam cylinder and the energy delivered to the workpiece is supplied by the velocity and weight of the ram and attached upper die driven downward by steam pressure. Energy delivered during each stroke may be varied.

Stripper

A mechanism or die part for removing parts or material from the punch.

Surface feet per minute (SFPM)

A measure of the speed of a point on the periphery (outer edge) of an abrasive wheel. It's calculated using the formula:

$SFPM = .262 \times \text{diameter of the wheel (in inches)} \times \text{RPM (revolutions per minute)}$

Example:

Wheel diameter = 24 inches

Spindle speed = 1000 RPM

$SFPM = .262 \times 24 \times 1000 = 3,144 \text{ SFPM}$



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Sweep device

A single or double arm (rod) attached to the upper die or slide of the press that's designed to move the operator's hands to a safe position as the dies close. Sweep devices aren't allowed for point-of-operation safeguarding.

Swing saw/overhead swing cutoff saw

A machine with a means of work support using a powered arbor and circular saw blade that pivots about a point located above the saw arbor.

Tenoning machine

A machine designed to use 2 or more cylindrical cutters, or one or 2 circular saws, to size or prepare (or both) the ends of a workpiece. The workpiece is supported on a table or conveying means. A means for clamping the workpiece is provided.

Terrazzo

A material of stone chips, such as marble, set in mortar and polished.

Threaded hole wheels

Abrasive wheels that have one central threaded bushing, securely anchored in place. They are mounted by being screwed onto a threaded machine spindle so that the wheel back seats firmly against an unrelieved flat back flange.

Tongs

Metal holder used to handle hot or cold forgings.

Tongue guard

An integral part of a safety guard that's located where the upper exposed part of the abrasive wheel meets the safety guard. It can be adjusted as necessary to maintain a set distance from the constantly decreasing diameter of the wheel.

Tooling

Elements for guiding or imparting a desired configuration to the material.

Definitions



Top grinding

Grinding done above the horizontal centerline of the wheel.

Towed conveyor

An endless chain supported by trolleys from an overhead track or running in a track on the floor with means for towing floor-supported trucks, dollies, or carts.

Trimming presses

A class of auxiliary forging equipment that removes flash (metal splash) or excess metal from a forging. This trimming operation can also be done cold, as in can coining, a product-sizing operation.

Trip (or tripping)

Momentary actuation of the activating control to initiate the cycle (stroke).

Trued

When the cutting surfaces of an abrasive wheel have been reshaped to expose new sharp cutting surfaces.

Turnover bar

A bar used in die setting to manually turn the crankshaft of the press.

Two-hand device

A device that requires the concurrent use of both of the operator's hands to both initiate and continue the machine cycle during the hazardous portion of the machine cycle.

Two-hand trip device

A device that requires concurrent operation of the trip controls or levers by the operator's hands to initiate the machine cycle.

Type A movable gate

A device that encloses the hazardous area when the machine cycles and doesn't open until the end of the cycle.



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Type B movable gate

A device that encloses the hazardous area when the machine cycles and opens when hazardous motion of the cycle is over. Type B devices aren't allowed on full revolution type machinery.

Type 1 wheel

An abrasive wheel shaped like a disc with a mounting hole in the middle. Sometimes called a "straight wheel." It has diameter (D), thickness (T), and hole size (H) dimensions. Grinding is normally done on the periphery (outside curve) of the wheel (T dimension). Can be used for grinding, cutting-off, and tuck pointing.

Type 2 wheel

An abrasive wheel shaped like an open-ended, hollow cylinder. Sometimes called a cylinder wheel. It has diameter (measured from the outer wall of the cylinder), wheel thickness (height of the cylinder), and rim thickness (thickness of the cylinder wall). Grinding is done on the end of the cylinder (rim thickness dimension).

Type 6 wheel

An abrasive wheel shaped like a straight-sided cup or bowl with a mounting hole in the bottom of the cup. Sometimes called a "cup wheel." It has diameter (D), thickness (T), hole size (H), rim thickness (W), and back thickness (E) dimensions. Grinding is normally done on the cup rim (W dimension).

Type 11 wheel

An abrasive wheel shaped like a cup or bowl with a mounting hole in the bottom of the cup. The sides of the cup aren't straight-sided but are angled outward. Sometimes called a "flaring cup wheel" since the sides are "flared" out. It has double diameter dimensions (top D and bottom J). It also has thickness (T), hole size (H), rim thickness (W) and back thickness (E) dimensions. Grinding's normally done on the cup rim (W dimension).

Type 16, 17, 18, 18R, and 19 wheels (See cone and plug wheels)

Definitions



Type 27 wheel

An abrasive wheel similar to a Type 1 wheel, but the center of the wheel around the mounting hole is pushed back (depressed). Sometimes called a "depressed center" wheel. It has diameter (D), thickness (U) and hole size (H) dimensions. The depressed center allows grinding on the flat surface of the wheel without interference from the flange or mounting hardware.

Type 27A cutting-off wheel

Similar to a Type 27 wheel. Specifically designed for use on cutting-off machines.

Type 28 wheel

An abrasive wheel similar to a Type 27 wheel, but the face of the wheel is angled upward and away from the mounting hole. The face of a Type 27 wheel is flat and perpendicular to the mounting hole. A Type 28 wheel is also called a "depressed center" wheel. It has diameter (D), thickness (U) and hole size (H) dimensions. The depressed center allows grinding without interference from the mounting. A Type 28 wheel has a saucer-shaped grinding rim and is designed for corner grinding and side grinding.

Type 29 wheel

An abrasive wheel that has reversed, saucer-shaped grinding rims (similar to a partially opened umbrella).

Unitized tooling

A die that has the upper and lower members incorporated into a self-contained unit that holds the die members in alignment.

Upsetters (or forging machines, or headers)

A type of forging equipment, related to the mechanical press, in which the main forming energy is applied horizontally to the workpiece that's gripped and held by prior action of the dies.

Wood products

Wood products include wood and reconstituted wood products that generate chips or dust in the processing of a wood piece.